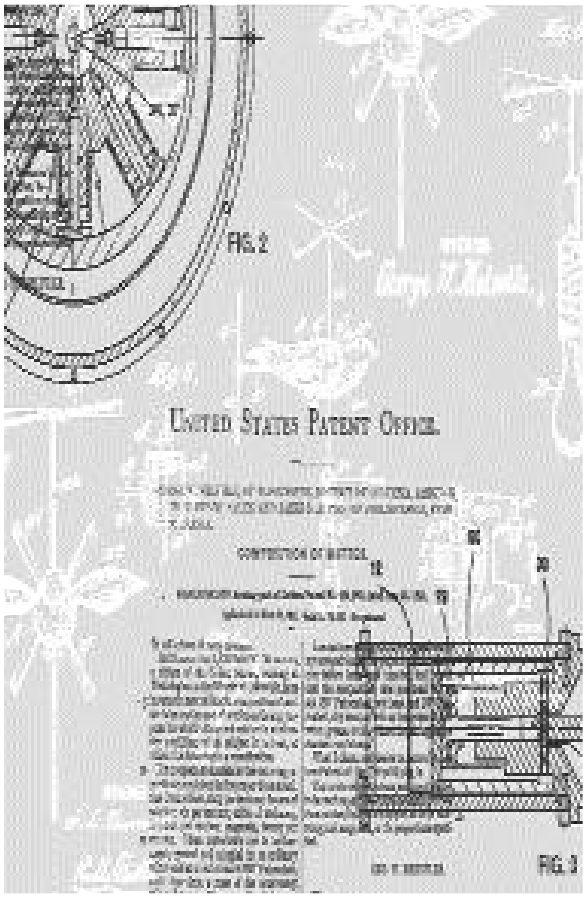
CARDEROCK DIVISION, NAVAL SURFACE WARFARE CENTER

TECH transfer UPDATE

Vol. 3, No. 2 April 1998

# Annual Issue on Patents




## Patent Statistics CY 1997

| | |
|---|---|
| 44 | Invention Disclosures |
| 34 | Patent Applications Filed |
| 35 | Patents Issued |

*The Carderock Division, Naval Surface Warfare Center (CDNSWC) has recently completed an upgrade to our patent web site, which now has the complete electronic text and cover sheet graphics for 753 patents. These patents represent the combined intellectual property of three divisions of the Naval Surface Warfare Center: Carderock Division – 485 patents, Dahlgren Division – 176 patents, and Indian Head Division – 92 patents.*

*Our old search engine is still available at http://www.dt.navy.mil/patents. If you wish to search the entire text of the database for a key word, this method is still the best. If you wish to perform a more sophisticated search, we now offer a greatly improved search engine at http://www.dt.navy.mil/patents/search.html. This web page allows you to customize your search by any combination of categories including division, patent number, inventor surname, issue date, U.S. patent classification number, or key word in the title or abstract.*

*A list of patents that we believe have significant commercial value appears at http://www.dt.navy.mil/online/tech/gen_tt/commerc7.htm. An explanation of the patent license application process begins at http://www.dt.navy.mil/online/tech/gen_tt/CD_PLA.htm. This group of pages also features an electronic copy of the Carderock Division patent license application.*

*Planned upgrades to the Carderock Division Patent Web Site include the annual addition of new patents, a short on-line course on the patenting process for Navy inventors, easier connectivity with other parts of the Division Web Site and a featured patent page which will include the story behind the patent as well as the patent itself.*

INSIDE

# From the Carderock Division

## From the Commander

John H. Preisel, Captain USN

*The annual patent awards ceremony recognizes the Division's innovations and inventors and it is a honor for me to participate. This is an opportunity to recognize important accomplishments, and to note my vision of the Division's future for innovative contributions to the Navy, and to the Nation. Our Division's technical know how and innovations are world class. They take on increased value when they are transferred into products. These 'products' in general were those transitioned to the Fleet, our primary customer. Our Navy and the DoD acquisition strategy is changing, and today this new way of doing business strongly encourages partnerships, dual-use technology and incorporation of off-the-shelf products. Therefore we are aggressively seeking partners for our R&D efforts to help expand the use of our capabilities and facilities. Developing partnerships for Navy and for commercial use is a welcomed challenge. This approach is also complimentary to our mission to support the Nation's maritime industry. We need to better understand our new customers and to be a reliable, dependable, and valued partner. We are making good progress. We are continually refining our partnering and technology transfer processes using the local authority we have been delegated. This includes patent licensing, CRADAs, and work for private party agreements. I encourage both our scientists and engineers to work together, with our potential partners to make these processes work for us. We have the great heritage of Admirals David Taylor and George Melville, and our first hundred years to build on. We plan to continue to demonstrate our most talented and unique capabilities for both the Navy and the Nation's maritime business.*

## From the Director

Richard E. Metrey, Director CDNSWC

*An article in the Baltimore Business Journal in 1995 headlined, "Plastics Machine; An Idea in Search of Entrepreneurs." This article focused on the Carderock developed plastic waste processor, a 'machine' that combines heat and pressure to reduce three 30-gallon bags of raw plastic trash into one easily and safely storable 21-inch diameter plastic disk. This new machine has now been installed on 170 Navy ships to process untreated plastic waste. Since the time of this article, the technology has been licensed, a CRADA has been completed, and the Carderock team developing the machine has won a 1998 award of tech transfer excellence from the Federal Laboratory Consortium. The license is for the manufacture of the machine for commercial ships. The CRADA focused on the development of composite marine pilings using the waste plastic disks produced by the machine. The commercial name of this product is SEAPILE, manufactured by Seaward International Inc., of Winchester, Virginia.*

*This is an outstanding example of a technology transfer success and demonstrates the involvement of our scientists and engineers. These professionals are very important to transition and technology transfer. The Carderock Division is continuing to build our tech transfer program and to better equip our technical personnel with the required knowledge and tools of tech transfer. In February, thirty-nine Division engineers and managers completed a new professional development class in 'Technology Outreach and Entrepreneurship.' This training course, led by the National Technology Transfer Center, focused on the how to and why of transferring Carderock technologies to the commercial marketplace. This training is another example of our Division's commitment to technology transfer.*

*The Division invites inquiries on partnering and technology transfer including patent licensing and CRADAs. Our goal is to make innovation, invention and technology transfer a part of every scientists and engineers job.*

S P O T L I G H T

# Commemorating 100 Years of Navy Tradition

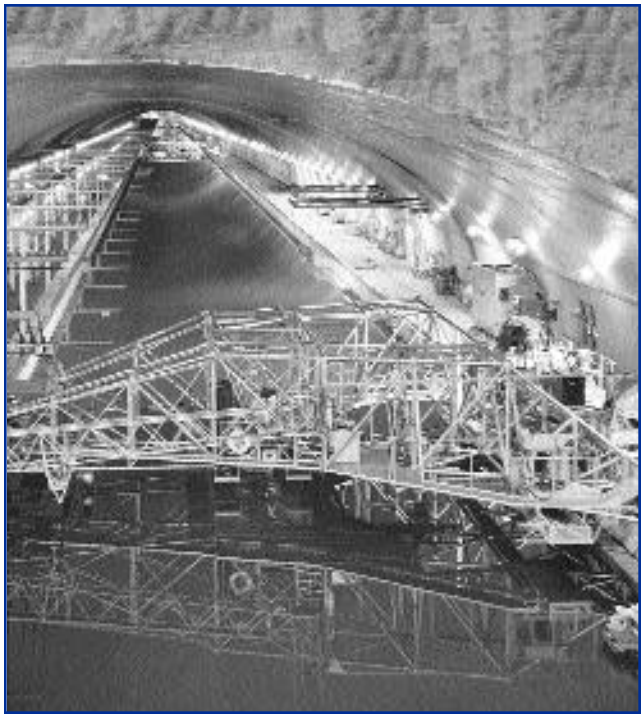
*Commencing in January 1998, the Division celebrates the 100th Anniversary of the founding of the Experimental Model Basin (EMB) at the Washington Navy Yard by Rear Admiral David W. Taylor.*

*Admiral Taylor used these facilities to bring modern methods of ship design, developed in the research institutions of Britain and France, to the United States. More than any other person, he transformed naval architecture in the U.S. Navy from a practical art to a science.*

*Admiral Taylor's technical contributions and accomplishments in the early days of naval architecture and model testing are legendary and not only provided important guidelines to designers and experimenters, but also served as the groundwork for some of today's technology.*

*When technology development outgrew Taylor's Experimental Model Basin, new facilities such as the David Taylor Model Basin (DTMB) were constructed. DTMB was constructed at the Carderock site and dedicated to Admiral Taylor in 1939.*

*The David Taylor Model Basin is among the largest of its kind in the world, containing a shallow-water basin, a deep-water basin and a high-speed basin. Using its sophisticated combination of towing carriages, wavemakers, and measuring equipment, engineers are able to determine the seakeeping qualities and propulsion characteristics of ship and craft models up to 40 feet in length. Since it became operational, the facility has provided key support in the development of naval architecture for the Navy, Coast Guard, the Maritime Administration, and maritime industry.*



*All 4,000 employees at the Carderock Division, NSWC not only share in his legacy but should be extremely proud that we continue to provide the Fleet and Maritime industry with quality research, engineering and testing of today's naval vehicles, to ensure safe and effective high performance systems.*

***During 1998 several events will take place commemorating the founding of the Experimental Model Basin in 1898, commencing with the designation of the David Taylor Model Basin as a National Historical Mechanical Engineering Landmark by the American Society of Mechanical Engineers (ASME).***

*This event took place Friday, January 30, 1998. Several members of Congress, Maryland dignitaries, and senior Navy officials were in attendance for this monumental occasion.*

# America's Cup Syndicates Test in Model Basin

*by Jim Scott*

The next America's Cup won't be sailed until 2000 in New Zealand, but some of the competing U.S. syndicates already are gearing up. Convinced that this is a fundamental step in designing a state of the art America's cup contender, a pair of syndicates have initiated tank testing in the David Taylor Model Basin. They are the New York Yacht Club's (NYYC) Young America and the St. Francis Yacht Club's America One.

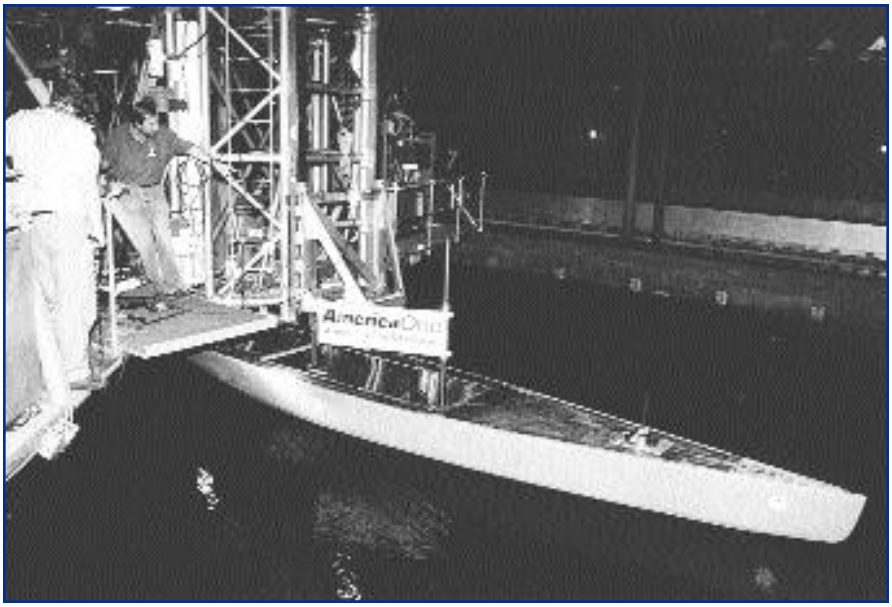
Bill Day, Head of the Facilities Engineering and Operations Department, coordinates and schedules the tank testing. He says the Model Basin is the ideal site for such testing. "Hull form and appendages such as the keel and rudder must be characterized as a set in order to determine the best sailing conditions for a particular design," states Day. "Large scale models approximately 25 feet in length are required to assure flow similarity with the real yacht and to acquire the quality of data needed to develop a winning design. We have been conducting tank testing on America's Cup model's since 1985 when DTMB worked with the Heart of America team in the campaign that was sailed in Perth, Australia."

America's Cup technology is now so precise and the design competition so close that even subtle design innovations can provide the competitive edge," said John Marshall, president of the NYYC/Young America. "Therefore, the methodology for testing design concepts must be that much more precise, with better repeatability and lower uncertainty in the results." The Young America syndicate developed a team that combines their expertise in yacht design and testing with the resources of the U.S. Navy and the advanced instrumentation methodology developed by the National Research Council of Canada.

Meanwhile, America One is using computer modeling coupled with physical modeling in a wind tunnel and the David Taylor Model Basin. According to America One officials, the towing tank is used to determine the total hydrodynamic resistance of several 25-foot models that are fitted with the appendages developed from wind tunnel data for keel/bulb combinations. The data provides the design team with further information and insight regarding performance of each design in the presence of the air-water, free-surface interface. This is an important element of sailing performance that cannot be modeled in a wind tunnel.

Although the syndicates are understandably very tightlipped about tank testing results, America One organizers recently invited media sailing experts to ride the carriage and observe towing tank procedures for their model. Reporters from the Washington Post, USA Today and Sail magazine attended.

Testing at DTMB is expected to continue throughout 1998 as United States syndicates refine the designs that will sail in Auckland for the right to challenge the Royal New Zealand Yacht Squadron for the America's Cup in March 2000.



America One organizers recently invited media sailing experts to ride the carriage and observe towing tank procedures for their model. Photo by P. Lama.

# Improved Gasket Design for Watertight Closures

*Carderock Division Naval Surface Warfare Center (CDNSWC) has recently developed and patented, an improved gasket design suitable for use in all Navy standard, manually operated non-ballistic structural closures in watertight, airtight, and even firezone applications. U.S. Patent Number 5,553,871 was issued to inventors Marlin D. Rowe and Francis A. McMullen of the Machinery in Service Engineering Directorate. The gasket material selected is a 30 durometer, flex and tear resistant silicone rubber. The unique feature of the gasket design is its configuration. A radius cutout in the back of the gasket provides added resiliency, and allows for quick and easy installation into the "C" shaped gasket channel of the closure. The new gasket has been adopted for use Fleet-wide by the U.S. Navy, as a direct replacement for the currently used gaskets. The new gasket design has also been adopted for use by the U.S. Coast Guard.*

*For over 50 years, the U.S. Navy has relied on a neoprene type gasket material, in accordance with military specification, MIL-R-900, to provide a watertight (WT) and airtight (AT) seal on virtually every manually operated structural door, hatch, and scuttle installed on Navy surface ships. The exception being structural closures installed in bulkheads designated as "Firezone Boundaries." Gaskets in these firezone closures were required to be in accordance with military specification, MIL-G-17927. While these two types of gaskets were suitable for the intended purpose, their service life was relatively short. The neoprene gasket material lacked resiliency, and would quickly develop a permanent set or groove from being compressed against the knife edge sealing surface of the closure frame. The gasket would also dry out, harden, and crack with age, making it difficult to compress when dogging the closure.*

*The gasket material used for closures in firezone boundaries consists of a multi-layered construction. The final result is an extremely hard and virtually incompressible gasket, with a rough surface texture that quite often does not provide a proper watertight or airtight seal.*

*The most significant advantages of the new gasket are reduced maintenance, extended service life, reduced component wear, increased ship survivability and overall reduced cost.*

*Installation time is reduced by 90%, thereby reducing maintenance hours spent on gasket replacement. Backfit oa an existing closure can be accomplished by one person in 20-25 minutes, as compared to two persons for two or more hours replacing the neoprene gasket. The labor is even more difficult when replacing the old firezone gasket.*

*Silicone rubber gasket material remains soft and pliable after many years of use. It is unaffected by extreme temperatures, prolonged exposure to sunlight, and retains its shape after repeated and extended periods of compression.*

*Because the new gasket is much softer than the previously used gasket, amount of force required on the operating handle of quick acting doors to dog the closure is reduced by 40%. This results in less friction on the operating mechanism, less wear on the bearings, dogs, and dog wedges, and provides smooth, easy operation of the closure.*

*Ship survivability is greatly increased with the use of the new gasket, which has been shown, through extensive testing, to have fire resistant qualities far superior to the "firezone" gasket (MIL-G-17927) previously specified for use throughout the Fleet. Thus, all closures having this gasket installed, will provide increased capability for the prevention of the spread of fire and smoke.*

*When used in closures in firezone boundaries as a direct replacement for MIL-G-17927, a cost savings of approximately $18 per linear foot is achieved. The cost of the new gasket is approximately $2.00 per linear foot as compared to approximately $0.75 per linear foot for MIL-R-900 gasket. However, cost savings are achieved through reduction in labor required for installation, longer life cycle, and lower friction (less wear) on moving parts, for the silicone rubber material.*

*Implementation of the use of the new gasket is being accomplished on existing ships in the Fleet through attrition, and ship alteration. Engineering Change Proposals have been initiated and approved for ships currently under construction, and requirements for the new gasket have been incorporated into Ship Specifications for future new construction. Over 50,000 manually operated WT and AT closures on U.S. Navy ships are affected by this change of gasket design. More than 350,000 feet of gasket has already been installed throughout the Fleet.*

*U.S. Patent Number 5,553,871 can be viewed on the Carderock Division web site at http://www.dt.navy.mil/patents/search.html. Please contact Mr. Dick Bloomquist, Director of the Office of Technology Transfer at (301)227-4299 for information on licensing opportunities.*

# Patent License Application Process

***"... the best technology policy unleashes the creative energies of innovators throughout the economy by creating a market that rewards invention and enterprise."***

**Clinton Gore Technical Policy**
*February 22, 1993*

***Patents are among the most important technical resources available. The Technology Transfer Act of 1986 was written to improve the transfer of intellectual property developed by the Federal labs to the private sector. It established a royalty sharing system for the lab and the inventor. This provided the process and the incentive for patent licensing by the labs. The Carderock Division has established a program to identify the patents having commercial potential and to license them. See our web site for more information on Carderock patents and details on doing business with Carderock.***
***Web address: http :// www.dt.navy.mil***

## How to License a Carderock Patent:

***The completion of the attached form is the entry point for applying for a Navy patent license. A key part is the applicant's plan for development and/or marketing the invention, section 14. This plan should contain specific information regarding the amount of fiscal resources, facilities and equipment, technical and other personnel resources, marketing mechanism or other resources the applicant will devote to carry out the plan to bring the invention to the commercial marketplace. The plan must identify a target date by which the invention is to be introduced and should include milestones which measure progress toward reaching that target. In addition, the plan should include projected yearly sales figures for several years of the license.***

## Notes:

- ***Licensees can only be granted to companies in good standing according to the Federal Acquisition Regulations.***

- ***Licenses are to be fair and reasonable for the Navy and the licensee to insure commercial application of the invention. Most licenses will include an up–front fee, a running royalty, and a minimum annual royalty. Appropriate amounts are negotiated with an emphasis on insuring commercial application, and returning a fare share to the taxpayer.***

- ***The licensing of an invention may include a CRADA with the Division for the transfer of the detail technology, know how, and/or further development of the invention. The use of a CRADA is an excellent approach for a licensee. CRADAs are the means to establish a contractual partnership for commercial development, and to benefit the Navy. Also, both parties have specific rights to new inventions made while doing work under a CRADA. Detailed information on CRADAs is available from the Carderock Technology Transfer Office and the Carderock Web Site.***

# Selected Recent Patents with Commerical Potential

| PATENT NO. | TITLE | INVENTORS |
|---|---|---|
| 5,486,811 | Fire Detection and Extinguishment System | John Wehrle, Ernest Dahl, James Lugar |
| 5,521,132 | Ash-Based Ceramic Materials | Inna Talmy, Deborah Haught, Curtis Martin |
| 5,227,982 | Digital Reverberation Time Measurement System | Blair Kipple, Douglas Noll, Andrew Chiang |
| 5,553,871 | Fluid Tight Door Gasket | Marlin Rowe, Francis McMullin |
| 5,358,686 | Titanium Alloy Containing Al, V, Mo, Fe, and Oxygen for Plate Applications | Warren Parris, James Hall, Paul Bania, Ivan Caplan |
| 5,468,356 | Large Scale Purification of Contaminated Air | Han Uhm |
| 5,448,503 | Acoustic Monitor | Richard Morris, Ronald Tate, Milton Matteson |
| 5,437,821 | Process for Making Carbon-Carbon Composites by Using Acetylene Terminated Conjugated Schiff's Base Monomers | Thomas Diberardino, Vicent Castelli |
| 5,426,373 | Two Electrode Device for Determining Electrical Properties of a Material on a Metal Substratum | Earl Diamond, George Loeb, Angela Ross |
| 5,025,849 | Centrifugal Casting of Composites | Amarnath Divecha, Subash Karmarkar |
| 5,481,904 | Oil Spillage Detector | Charles Fleck Sr. and Jr,Michael Sweeney |
| 5,473,718 | Fiber Optic Loose Tube Buffer to Fan Out Tube Adapter System | Keith Sommer |
| 5,468,570 | Lightweight Zinc Electrode | William Ferrando |
| 5,411,697 | Method for Processing Contaminated Plastic Waste | Peter McGraw, John Drake, Thomas Hane |
| 5,389,411 | Composite Structure Forming a Wear Surface | Edward Cohen |
| 5,624,577 | Disposal of Oil Spill Cleanup Collections | John Wehrle, Eugene Fischer, John Ness Barbara Howell |
| 5,379,711 | Retrofittable Monolithic Box Beam Composite Hull System | Eugene Fischer, Roger Crane |
| 5,378,413 | Process for Preparing Microcapsules Having Gelatin Walls Crosslinked with Quinone | James Mihm, George Loeb, Elizabeth Haslbeck |
| 5,370,087 | Low Vibration Polymeric Composite Engine | David Guimond, Rolf Muench |
| 5,362,580 | Lightweight Battery Electrode and Method of Making It | William Ferrando, Amarnath Divecha |
| 5,356,936 | Process for Producing Hydrophilic Polymer Membranes | Barbara Howell, Ravanasamudram Venkatachalam, John Wehrle |
| 5,337,288 | Acoustic and Vibration Attenuation Composite Material | Usman Sorathia, Joseph Killian, Andrew Jarrett |
| 5,047,990 | Underwater Acoustic Data Acquisition System | Adamandios Gafos, Donald Maxwell, Frank Halliwell, Dana Lynn, Christopher Sears |
| 5,266,099 | Method for Producing Closed Cell Spherical Porosity In Spray Formed Metals | Paul Kelly |
| 5,408,874 | Location of Fluid Boundary Interfaces for Fluid Level Measurement | Charles Fleck, Sr., Charles Fleck, Jr. |
| 5,232,639 | Process for Forming Articles with Anisotropic Properties | Ronald Reitz, Armando Santiago |
| 5,213,713 | Process of Shaping an Electrorheological Solid | Ronald Reitz |
| 5,025,849 | Centrifugal Casting of Composites | Amarnath Divecha, Subash Karmarkar |
| 5,601,867 | Method and Apparatus for Generating Fingerprints and Other Skin Prints | Harold Riedl, Robert Jehle |
| 5,365,457 | Dynamic In-Situ Materials Tester & Curemeter | Walter Madigosky |


CARDEROCK DIVISION
NAVAL SURFACE WARFARE CENTER
NSWC

**http://www.dt.navy.mil**

## *Toward an Allstar Technology*

***Major league baseball is not the only place where allstars can be found. Technology transfer allstars are created when the inventors hit a home run.***

***A technology transfer home run happens when "all the bases are covered." First base is reached when a patent is issued providing a measure of protection for our valuable intellectual property. Second base is touched when a CRADA guarantees the continued development and commercialization of a technology. A technology tags third base when a patent license is signed. And, the technology comes home when sales of a commercial product provide the inventors and the Division with an ongoing revenue stream.***

***Vince Castelli's process for making a carbon-carbon composites is running towards second base. Dave Divecha and Subash Karmarkar's centrifugal casting patent is approaching third base. Peter McGraw's plastic waste processing team (John Drake, Thomas Hare, and Charles Kelly) is rapidly approaching home.***

***We look forward to our first allstar technology and its representation in the Carderock Technology Hall of Fame in the coming year. We hope many will join in the near future.***

**TECH *transfer* UPDATE**
***DEPARTMENT OF THE NAVY***
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